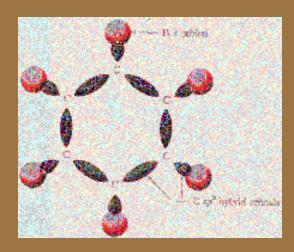


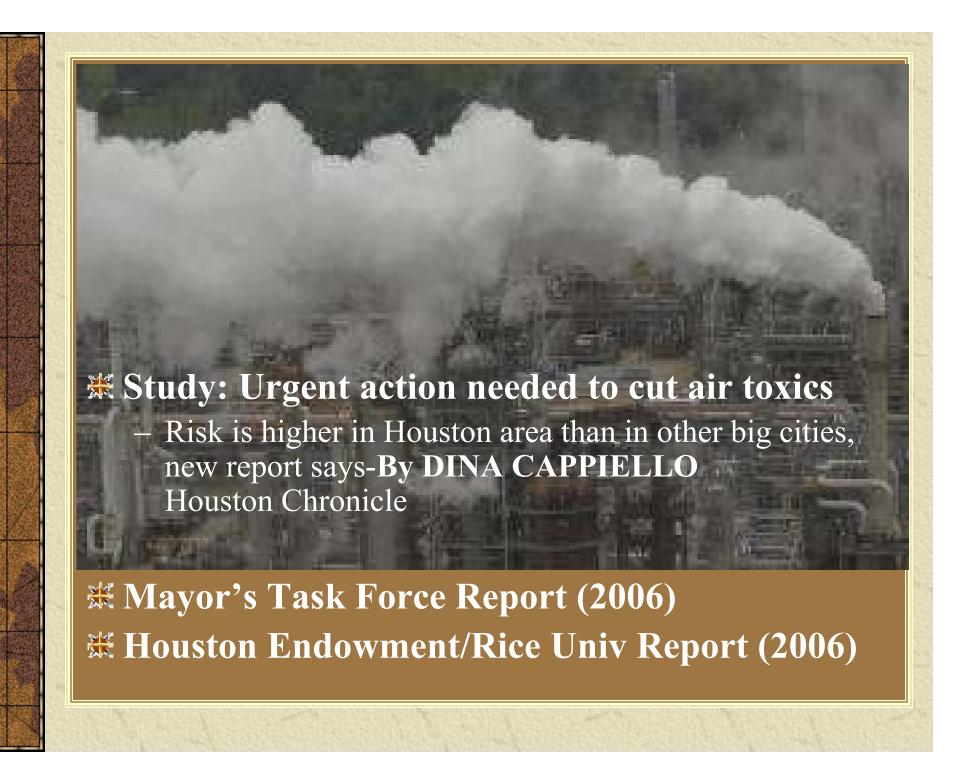
Arturo Blanco and Dan Hoyt
Health Department, Bureau of Air Quality
Dr. Loren Raun
Mayor's Office of
Environmental Programming

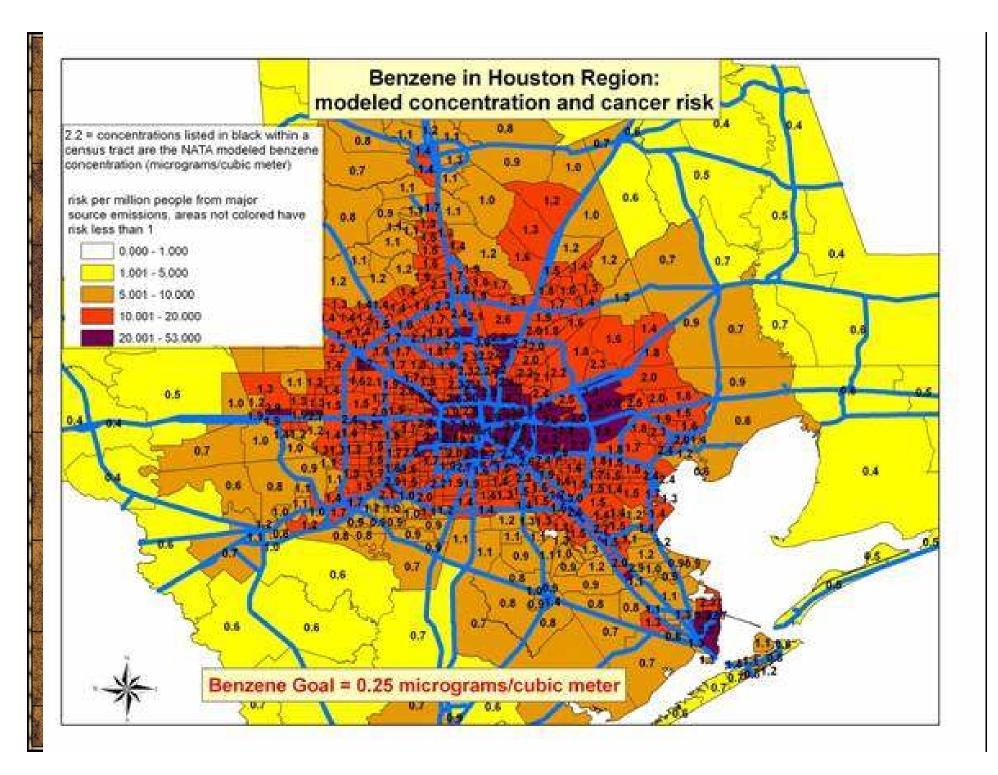
The Problem: Benzene

- Class A, human carcinogen
- Tumor Type: Leukemia
- Test Species: Human
 - Route: Inhalation, Occupational exposure:

Benzene







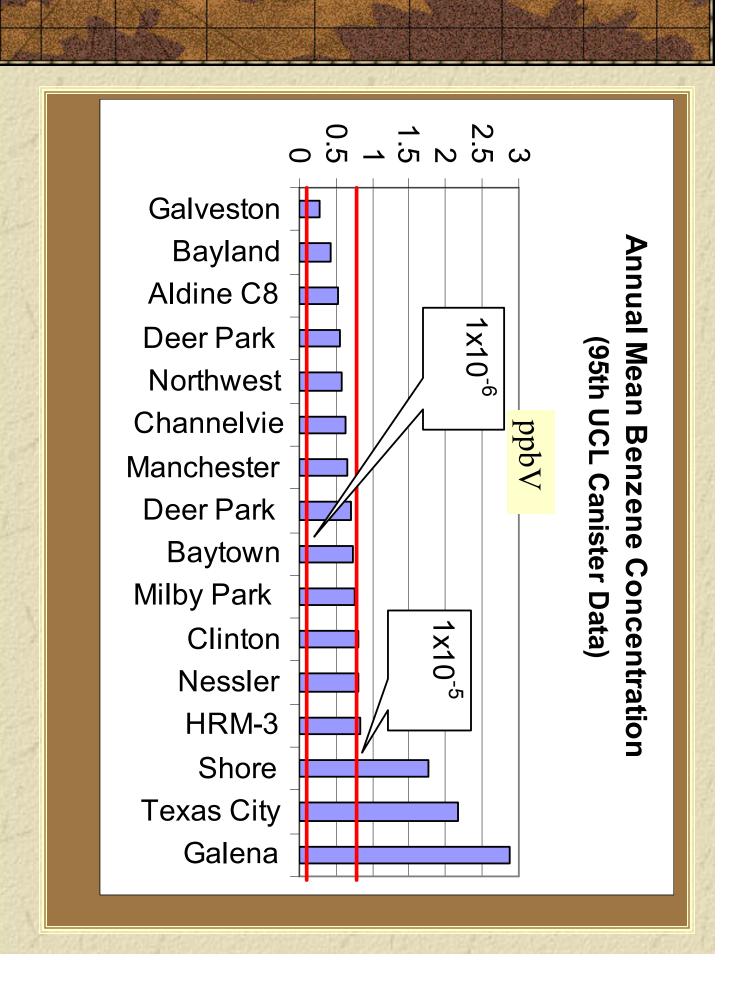
How much data is that?

**Auto GC data in a year:

- 8760 hourly data points for one constituent at one monitor
- 438000 data points per monitor
- 87600 data points of one constituent across all monitor

Air Toxic Data

- * 1 hr Canister:
 - 3 sites
 - Monitors for around 100 compounds, event triggered.
- **24** hr Canister Sites:
 - 16 sites
 - Monitors for around 100 compounds, every sixth day.
- ** Auto GC Sites:
 - 10 Sites
 - Monitors for around 50 compounds,
 - samples for 45 minutes, analyzes for 15 minutes, data represented as hourly averages.



2000 CENSUS TRACTS

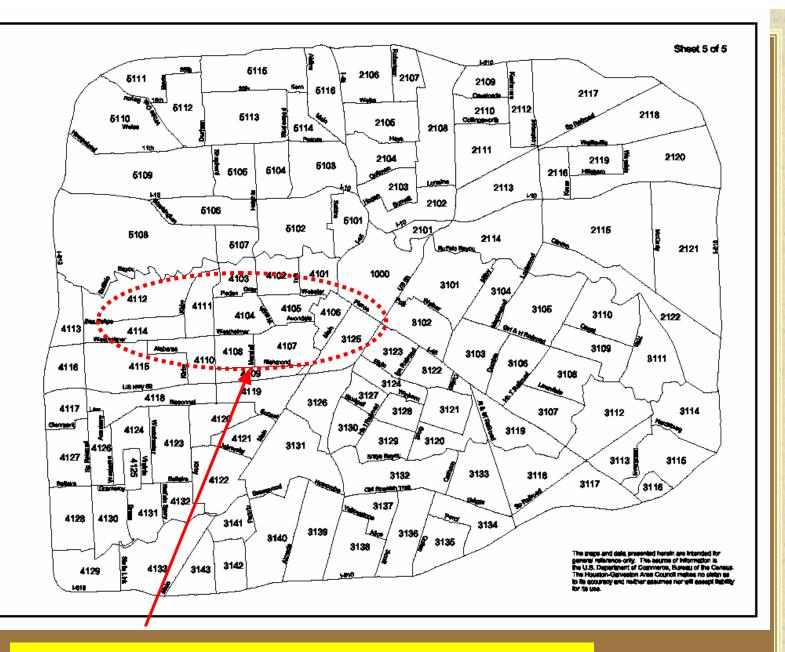


Harris County

Tract boundary
County line



repared by the Houston-Galveston Area Council, February 2003



Cancer risk of 20-53 in one million

The Benzene Air Toxic Framework

- No current ambient standards
- Monitor sample data indicate that concentrations pose a health risk
- Models indicate that the air toxic posing the most threat to health in Houston is
 - benzene and
 - the largest sources include emissions from cars, industry, and gas stations
- Air does not respect city boundaries

The Air Toxic Framework

- 1. What we can't directly do?
 - regulate cars, trucks, trains, ships, planes or
 - industries polluting from outside the City Limits
- 2. Where does the majority of our air pollution

come from?

3. What can we do?





Voluntary

Multi-sector Benzene

Reduction Plan



Promote Voluntary Reductions of Emissions



1. Citizens and businesses

2. Industry sources

3. Lead by example



Benzene Goals for Ambient Air in Houston

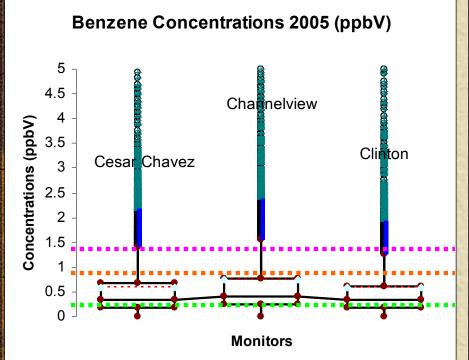
Goal: to improve air quality in the Houston region by reducing the ambient air concentrations of hazardous air pollutants, such as benzene.

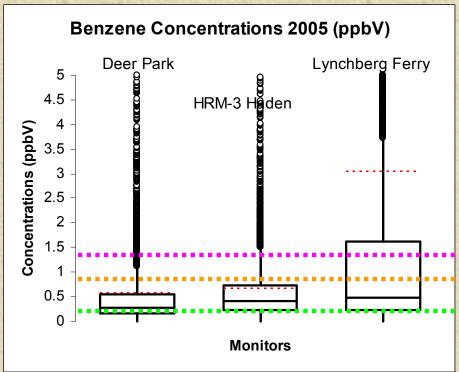


Benzene Goals for Ambient Air in Houston

- Long term (10 years): 1 case per 1 million people (0.14 ppb or 0.45 μg/m³)
- Intermediate (5 years): 5 cases per 1 million people (0.7 ppb or 2.2 μg/m³)
- Short term (3 years): 10 cases per million people (1.4 ppb or 4.5 μg/m³)

Boxplots of Houston Benzene Concentration (trimmed scale)





The Approach

1. Identify the largest source contribution by census tract

2. Develop strategies by census tract

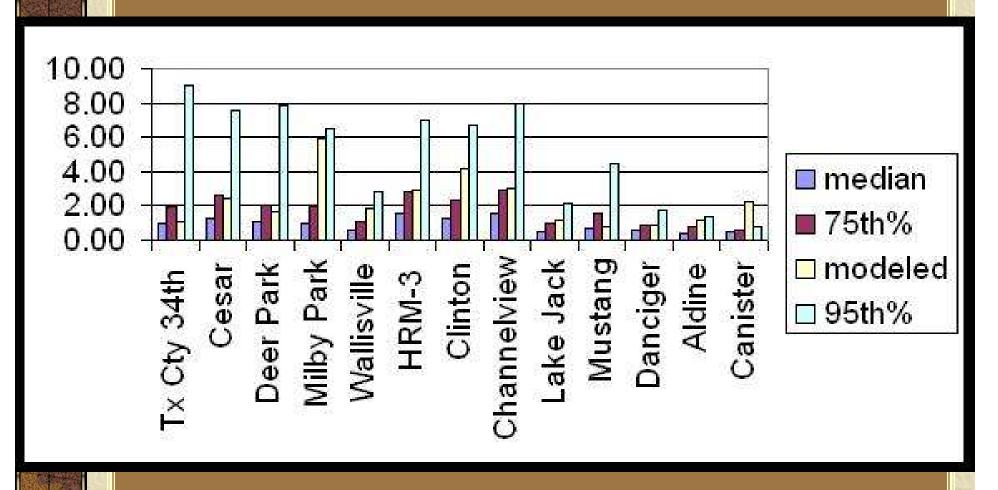
3. Engage in a partnership within the community to voluntarily reduce emissions

Identify Emission Sources by Census Tract

Identify source types contributing the majority of the emissions by census tract (NATA)

- Onroad mobile
- Major source
- Area source

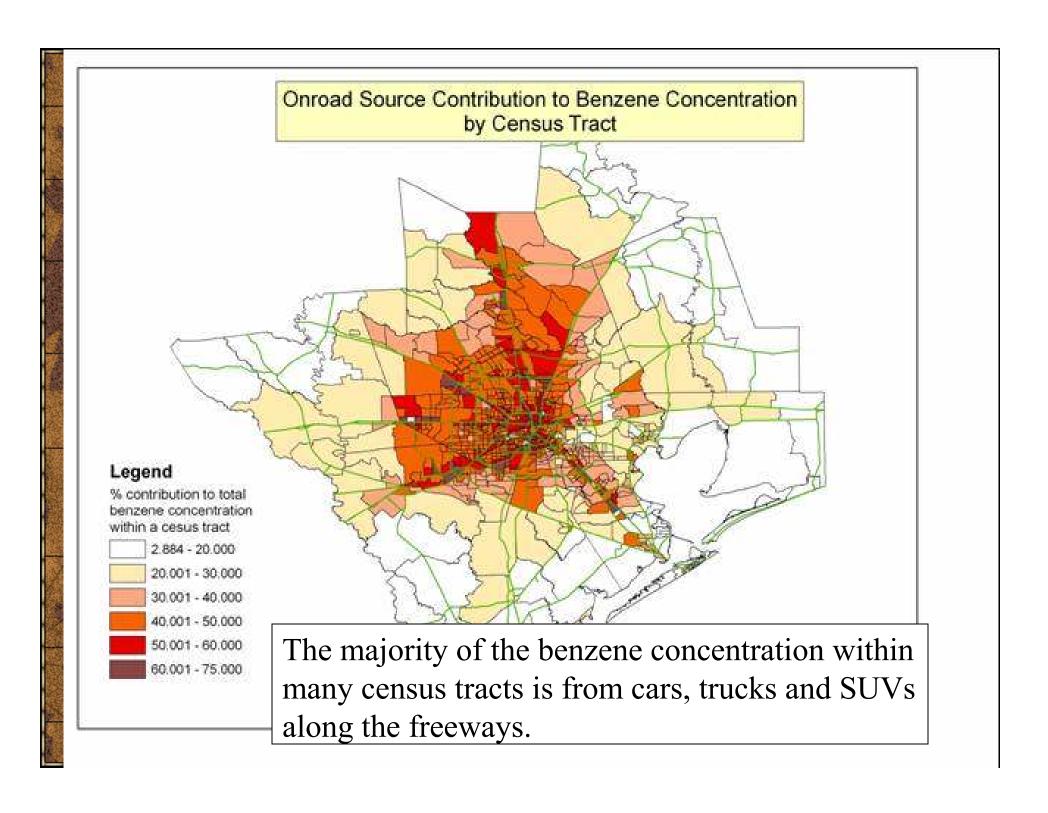
Measured vs. Modeled Benzene

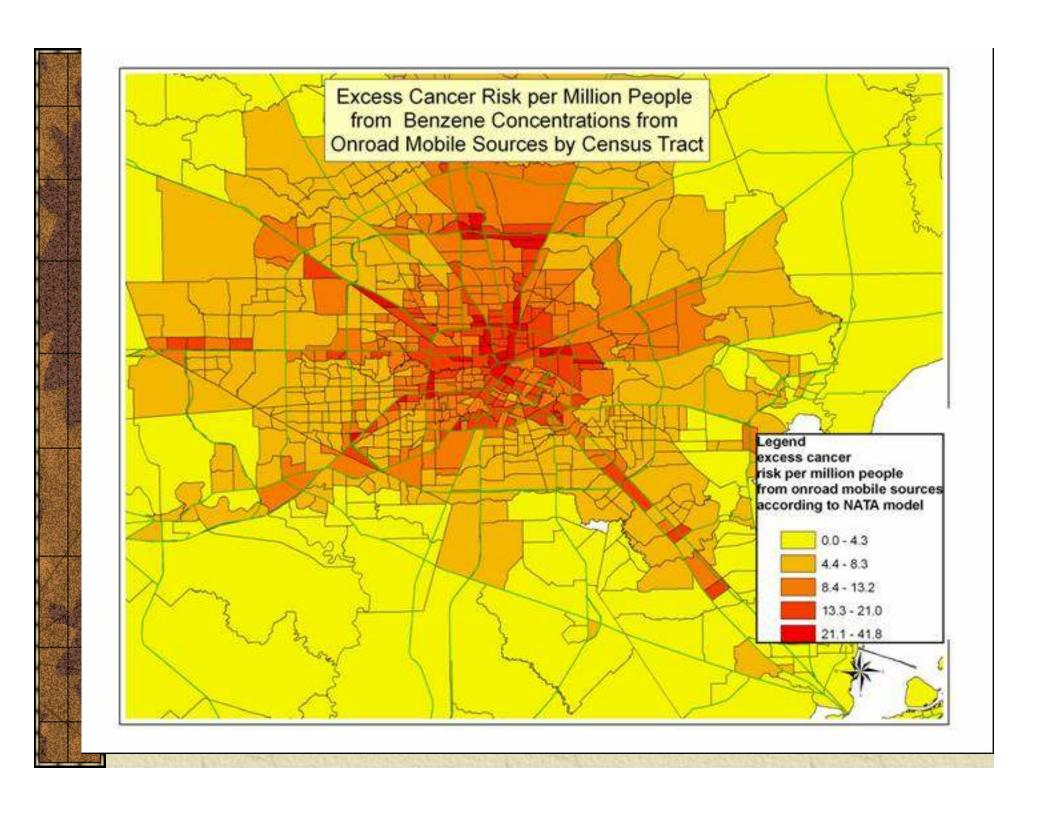


Benzene concentration ($\mu g/m^3$):









Onroad Mobile Reduction Strategy

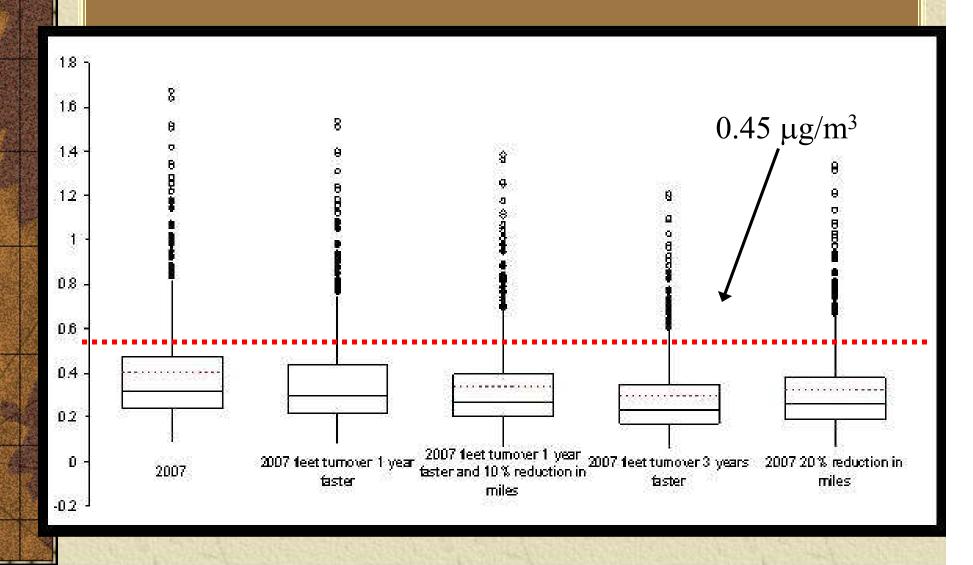
- 1. Calculate benefit from mobile source reduction scenarios
- 2. Educate citizens and business with respect to onroad mobile issues and how to reduce emissions
- 3. Ask for, quantify and verify reductions

Onroad Mobile Reduction Strategy: Calculations

MOBILE6

- base case and four future years assuming traditional regulatory emission controls
- reformulated gasoline and Tier 2 vehicle fleet turnover
- **NATA model emission and concentration to Mobile 6 output estimate
 - concentration for each census tract and model run year.

Onroad Mobile Reduction Strategy: Calculations



Status Quo Onroad Mobile Vehicle emissions and the Goal

**Our models indicate that in 1999:

- 96% of the census tracts met the short term goal,
- 60% met the intermediate goal and
- − 0% met the long term goal.

** We estimate that in 2007:

- 100% of the census tracts will meet the short term goal,
- 100% will meet the intermediate goal and
- 71% will meet the long term goal.

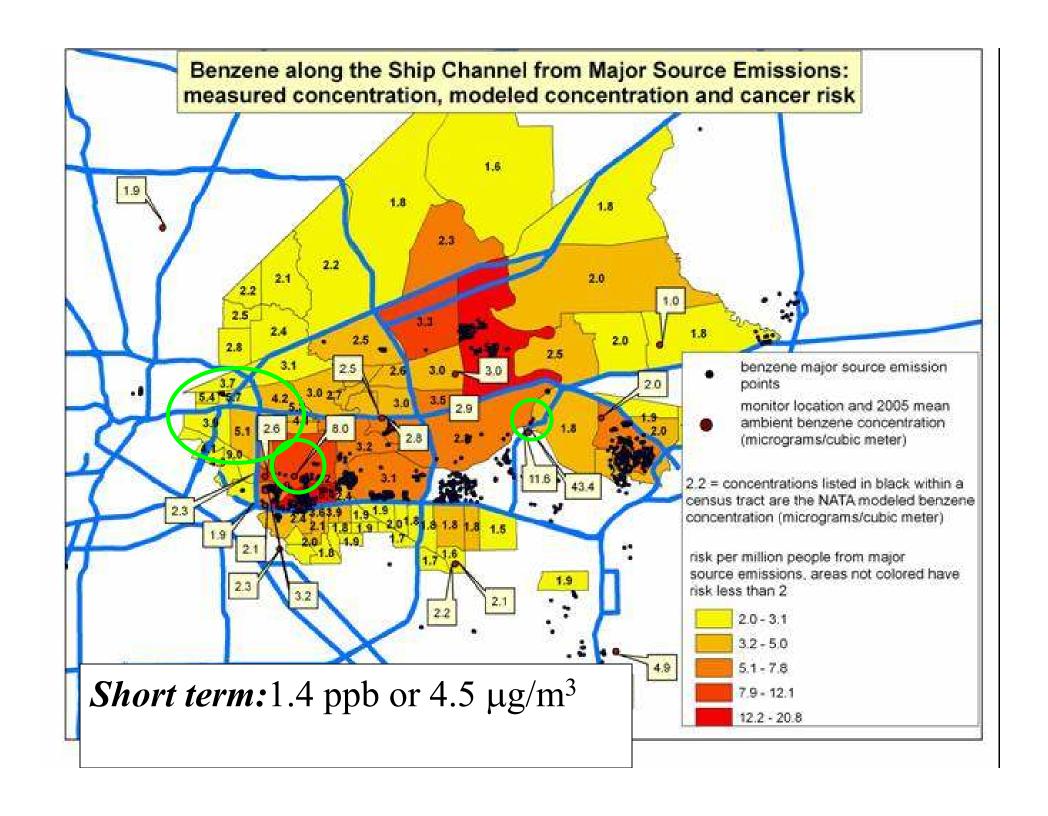
Voluntary Reductions of Onroad Mobile Vehicle emissions and the Long Term Goal

- # Quicker fleet turnover = +5% of the census tracts will meet goal (total of 76%).
- Reduction of the total vehicle miles traveled in 2007 by 10% = +4% of the census tracts will be below goal (total of 80%).
- Both fleet turnover acceleration and the total vehicle miles traveled is reduced by 10% = 96% of the census tracts will be below goal by 2010.

Emission Reduction Strategies

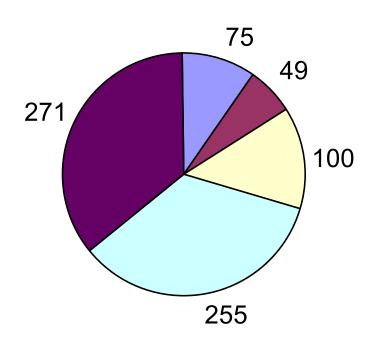
- 1. Pledge to make a difference in reducing air toxics
- 2. Drive an environmentally friendly car.
- 3. If you are eligible, participate in the LIRAP program.
- 4. Drive fewer miles.
- 5. Encourage employees to drive fewer miles.
- 6. Use less gasoline.





Emitters and Sources: Ranked

2004 Houston-Galveston-Brazoria Area Reported Point Source Benzene Emissions (tons-per-year)

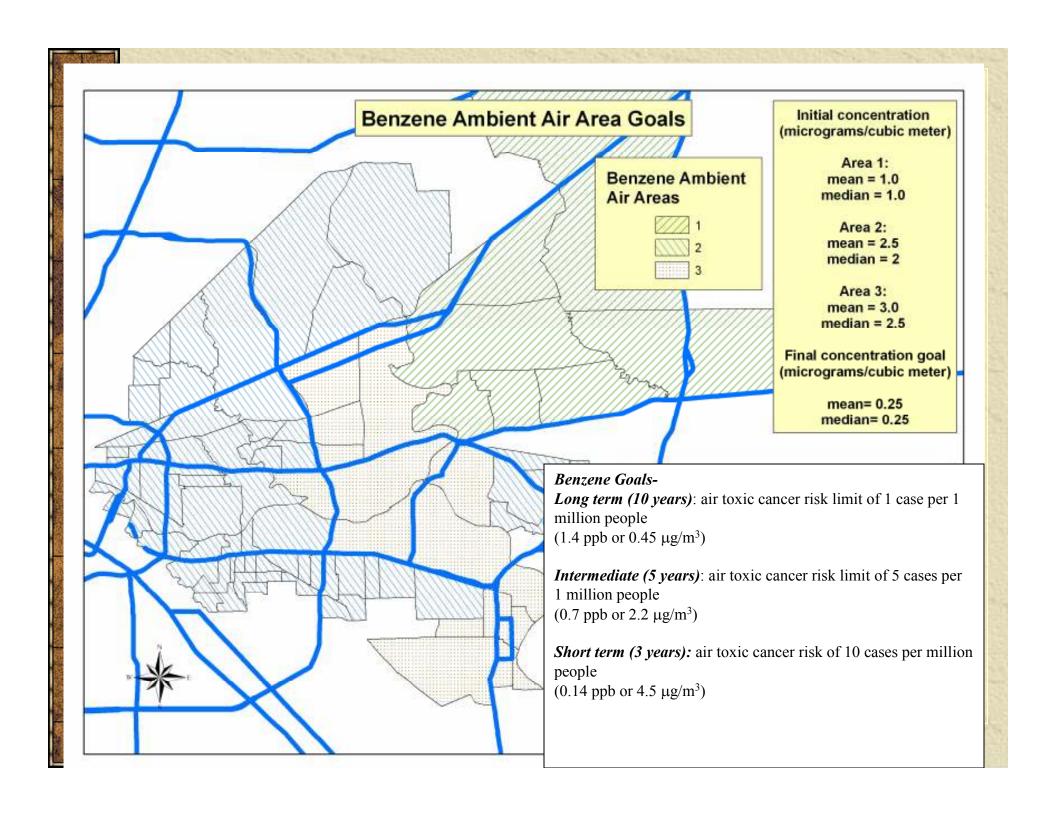


■ Wastewater

■ Cooling Towers

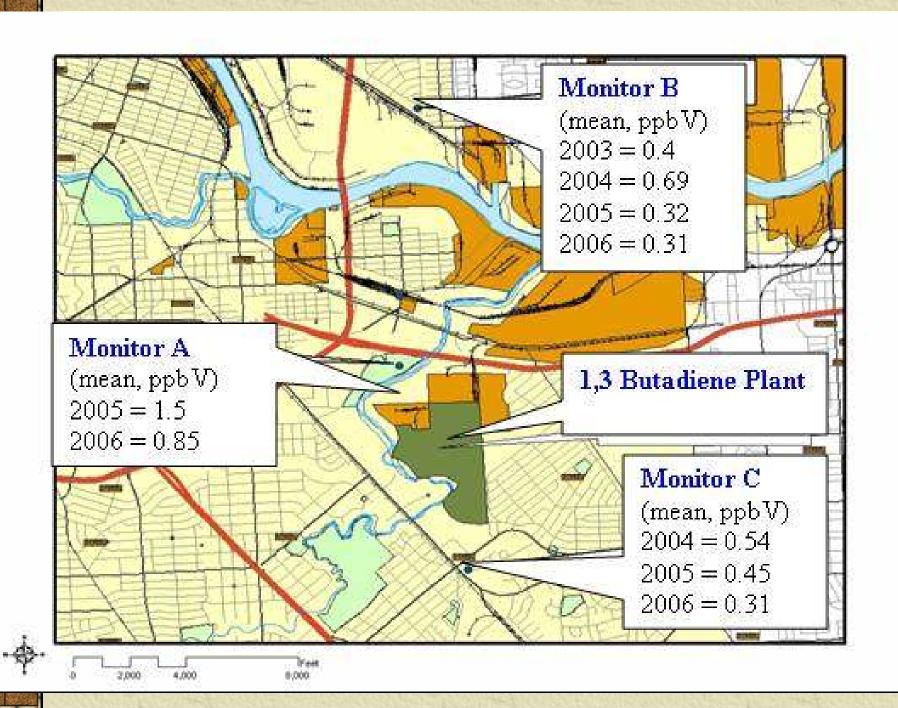
□ Flares

- □ Fugitives (not including Cooling Towers, Wastewater or Tanks)
- Other (Loading/Unloading, Vents, etc)



Case Study: Reduction Measures

- #Flare gas recovery
- **FTIR open path monitoring along the north and south fence lines
- LDAR leak definition reduced from 500 ppm to 250 ppm
- Attempt to correct leak within one day for leaks monitored at concentrations above 100 ppm
- IR Camera used at least quarterly and during startups



Area Source Investigation

- •IR Camera survey of phase I/II vapor recovery
- •Stratified random sample pilot study
 - •10% of gas stations
 - •Stratification Mom and Pop vs large industry



Lead by example

- Hybrids
- Metro rail
- Carpool
- telecommute
- no more mow
- TxDot



MAYOR BILL WHITE USES "FRESH AIR FRIDAY" TO ANNOUNCE IMPLEMENTATION PLAN FOR HYBRID VEHICLES IN CITY FLEET

Conclusion

- A clean air legacy
 - Short term priorities
 - Intermediate Goals
 - Long term vision